Polymorphism originally arises from genetic mutation, it is when there are two or more alleles expressed at a specific locus within a population. The reason for the persistence of polymorphism within a population may be due to natural selection for given traits, gene flow from surrounding populations or genetic drift. In the case of the land snail *Ceapaea nemoralis*, the polymorphism in the genotype can easily be observed in the phenotype, as the shell colouration and the number of bands. The colours of the shell may be yellow, brown or pink and the shell may have a number of dark bands between zero and five. Shell colour is determined by a series of alleles. Brown is dominant to pink, and pink is dominant to yellow. The unbanded allele is dominant to five banded. (Jones *et al* 1977) Since *C. nemoralis* moves only short distances during their life span, expresses obvious polymorphism and shows great differences in the allelic frequencies of the morph gene between micro populations over short distances it is a good species to use as a genetic model, although a heterozygote cannot be distinguished from a dominant homozygote.

The aim of the investigation was to determine what factors affect the frequency of alleles within *C. nemoralis* populations in the Chilterns area, and whether the frequencies observed are due to natural selection or genetic drift.

The snails were sampled in situ and the morphology of the shells recorded. Both live and dead snails will be counted, as after an individual snail has died, the shell remains behind and leaves a physical record of the expressed genes of that individual. However, as all snails eventually die – whether as a result of predation or senescence – no attempts to determine the cause of death, or to relate death to natural selection or genetic drift will be made. Different sites within the Chilterns area will be sampled in order to record a larger number of observations, and this range of sample sites will include a number from grassland areas, a number from shrub or forb areas and over vertical zonation. These sites were chosen because it was discovered in previous investigations that banded forms tend to be found in diversified habitats, such as mixed hedgerows, and the unbanded snails against more uniform backgrounds, such as those of dense woodlands. It was suggested that banding pattern may be an adaptation for camouflage to protect snail from predators, such as birds. Thermoregulation can also influence the appearance of *C. nemoralis*. Snails that live on the hill are more exposed to sun than snails that live on lower elevations. During hot weather, the snails that have more bands, or have darker shells warm up quicker than lighter snails. This can affect mortality of snails, as they can die because of too high temperature. (Jones *et al* 1977) In order to carry out statistical analysis, repetitions will be carried out, and as many snails as possible will be sampled so as to have more data. Assuming that natural selection has been acting on the population and is the primary reason behind the distribution of snail morphs it would be expected that the local population within sampled sites would have significant patterns in areas of a similar habitat. If drift is the primary reason behind the distribution of morphs then it would be expected to see no significant patterns between similar sites.

It was hypothesised that natural selection is a major cause in determining the distribution of the polymorphic population of *C. nemoralis.* It is expected that there will be a larger number of unbanded shrubs in the grass grassy sites than in the shrub sites and darker coloured, or brown, shells in lower elevations than higher.

Word Count: 619

Jones et al 1977.  Polymorphism in Cepaea: A Problem with Too Many Solutions? Ann Rev Ecol Syst **8**:109-143.